COMMUNICATION CORNER

Small antennas for small boxes

By F. Vinton Long

There is a new, small-size, high-efficiency, parabolic antenna available which we gassers might use. It was designed for educational and closed-circuit television in the 2500 GH_z band, but could be adapted to our microwave frequencies.

The sizes are 1-, 2-, 4-, and 6-ft diameter parabolic antennas employing dipole feeds. Gain ranges from 15 to 30 db.

The dipoles are fed from the rear of the reflector with a low loss, ½-in. heavy-wall diameter, 50-ohm coaxial cable that does not require pressurization. The dipoles are fully protected from rain, wind, dust, etc.

The reflector is a spun aluminum dish, 1/16 in. thick, with a closed rolled bead at the perimeter for extra strength. A reinforcing ring-back structure is provided for rigidity and devices are included for mounting to a 2-, 3-, or 4-in. pipe. An elevation mechanism is provided for adjustment up to ±7°. Azimuth can be adjusted 360° by rotating the antenna on the mast. The antennas are designed to survive winds of up to 100 mph.

Polarization adjustment is simplified by the incorporation of a slip ring assembly at the feed mounting ring located at the vertex of the dish. This design enables mounting of the dipole feed from the rear of the dish and requires no guy wires or spars.

Electrically, the new antennas feature 55% minimum efficiency, utilizing a smooth contour dish providing low VSWR and controlled radiation pattern characteristics.

Adjustment of electrical parameters is available for low VSWR, increased gain or narrower beamwidth over small operating frequency bands.

The gain of a typical 6-ft dish at 2500 GH_z is about 30 db. However, thought should be directed to the use of the smaller size such as the 1-ft diameter. This could be made part of a simple, inexpensive microwave telemetry package for remote telemetry from sales meters, checkpoints, and wellheads.

In this case, the solid-state microwave transmitter would be used and would be mounted in a waterproof box with a small antenna attached to the top. The entire installation could be pole-mounted at the site. And, because of the low power requirement of solid-state equipment, it would be entirely feasible to provide prime power by a thermoelectric generator.

The assembly would be one more step toward our dream of little black boxes which can be mounted on fence posts.

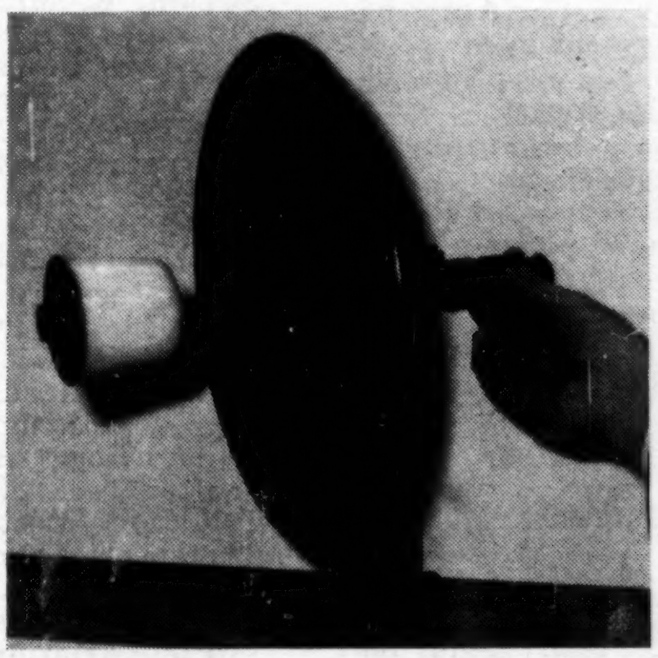
ALTERNATE VOICE-METERING SERVICE

There is a new offering being contemplated by the Bell System which certainly might be of interest to the gas industry. It is a technique of alternate voice-metering which allows one to use both data transmission/telemetering and voice communication on the same leased circuit.

Some features of a proposed system which have been worked out with a major pipeline follow: (In this particular case, the pipeline contemplates bringing in data from six remote locations to the dispatcher via 18 derived channels.)

- Twenty-plus one-way low-speed channels to be derived from a voice grade data circuit.
- Allocation of channels in a given direction up to customer. All might be one-way west to east; 8 might be west to east, with 12 used for east to west transmission, etc. Service may be multipoint.
- Number of derived channels will probably depend upon grade of voice frequency data service. For example, more LF channels would be derived from a Type 4C data circuit than from a Type 4A.
- Operation of service will be dispatcher controlled. To obtain metering information, dispatcher sends a signal to start all metering devices to read out. Dispatcher then selects station he wants to receive from by selecting the channel associated with that station.
- Derived channels will be capable of delivering d-c impulses to a relay winding, or of accepting d-c pulses from a set of dry contacts. The system upon which the development inquiry is based contemplates 15 pps d-c service. Customer owned and maintained equipment will be used to allow multiple control functions to be transmitted via each derived channel, or to allow metering information from several devices at a single location to be passed via a single derived channel.

The equipment being considered offers an alternate telephone arrangement which may be adopted. This arrangement allows the dispatcher to switch all units on a voice grade data facility from the data (metering and control) mode to the telephone mode of operating and back at will. Practical operation would probably require that one derived channel be used to signal the dispatcher from a remote station. Upon receipt of such a signal, the dispatcher could switch to "telephone mode" and talk with the man at the remote location. This feature could eliminate any requirement for parallel voice circuit to provide occasional telephone communications. □



One-foot diameter high efficiency paraolic reflector. Gain: 15 db. (Photo courtesy Prodlin, Inc.)

GAS

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